

## **REMARKS**

### **Status of the Claims**

Claims 8-10 are pending in the present application and stand ready for further action on the merits.

### **Claim Rejections under 35 U.S.C. §103(a)**

Claim 8 is rejected under 35 U.S.C. § 103(a) as being unpatentable over **Kuroda JP'579** (JP 11-349579) in view of **Schulz US'956** (US 6,090,956) in view of **Hancock US'032** (US 5,367,032).

Claims 9 and 10 are rejected under 35 U.S.C. § 103(a) as being unpatentable over **Kuroda JP'579** in view of **Schulz US'956** in view of **Venturello US'276** (US 4,562,276) in view of **Venturello EP'742** (EP 0 232 742) in view of **Ishii US'922** (US 6,375,922).

Reconsideration and withdraw of each of the above rejections is respectfully requested based on the following considerations.

### **Legal Standard for Determining Prima Facie Obviousness**

M.P.E.P. § 2141 sets forth the guidelines in determining obviousness. First, the USPTO has to take into account the factual inquiries set forth in *Graham v. John Deere*, 383 U.S. 1, 17, 148 USPQ 459, 467 (1966), which has provided the controlling framework for an obviousness analysis. The four *Graham* factors are:

- (a) determining the scope and content of the prior art;
- (b) ascertaining the differences between the prior art and the claims in issue;
- (c) resolving the level of ordinary skill in the pertinent art; and
- (d) evaluating any evidence of secondary considerations.

*Graham v. John Deere*, 383 U.S. 1, 17, 148 USPQ 459, 467 (1966).

Second, the USPTO has to provide some rationale for determining obviousness. MPEP § 2143 sets forth some rationales that were established in the recent decision of *KSR International Co. v. Teleflex Inc.*, 82 USPQ2d 1385 (U.S. 2007). Exemplary rationales that may support a conclusion of obviousness include:

- (a) *combining prior art elements according to known methods to yield predictable results;*
- (b) *simple substitution of one known element for another to obtain predictable results;*
- (c) *use of known technique to improve similar devices (methods, or products) in the same way;*
- (d) *applying a known technique to a known device (method, or product) ready for improvement to yield predictable results;*
- (e) *"obvious to try" – choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success*
- (f) *known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art;*
- (g) *some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.*

As the M.P.E.P. directs, all claim limitations must be considered in view of the cited prior art in order to establish a *prima facie* case of obviousness. See M.P.E.P. § 2143.05.

Distinctions Over the Cited Art

**Claim 8**

Instantly pending claim 8 recites as follows:

*8. A process for producing a  $\beta$ -hydroxyhydroperoxide compound or a carbonyl compound, which comprises reacting an olefin with hydrogen peroxide in the pH range of 0 or more and less than 2 in the presence of a metal catalyst obtained by contacting*

*(A) at least one metal or metal compound selected from*

*i) tungsten compounds composed of tungsten and an element of group IIIB, IVb, Vb, or VIb.*

*ii) molybdenum compounds composed of molybdenum and an element of group IIIB, IVb, Vb, or VIb, and*

*iii) tungsten metal and molybdenum metal;*

*(B) at least one compound selected from tertiary amine oxide compounds and nitrogen-containing aromatic N-oxide compounds;*

*(C) hydrogen peroxide; and*

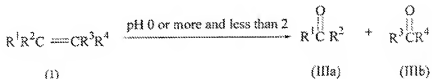
*(D) a phosphate compound,*

*wherein the carbonyl compound is produced by oxidatively breaking a carbon-carbon bond of the olefin.*

Accordingly, present claim 8 defines a process for producing a  $\beta$ -hydroxyhydroperoxide compound or a carbonyl compound, which comprises reacting an olefin with hydrogen peroxide in the pH range of 0 or more and less than 2 in the presence of a metal catalyst obtained by contacting (A) to (D) as defined,

wherein the carbonyl compound is produced by oxidatively breaking a carbon-carbon bond of the olefin.

In the process for producing a carbonyl compound according to the invention, a carbon-carbon bond of the olefin is cleaved as follow (*see scheme 3 in page 35 of the description, which is reproduced below*).



Scheme 3

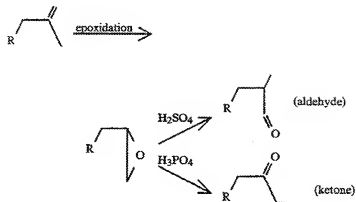
In this process, the products have carbon atoms fewer than the reactant because of breaking the carbon-carbon bond in the reactant.

The USPTO contends that instant claim 8 is unpatentable over **Kuroda JP'579**, in view of **Schulz US'956** and **Hancock US'032**.

However, **Kuroda JP'579** and **Schulz US'956** only teach the process for producing an epoxy compound. Further, **Kuroda JP'579** only teaches a process for producing an epoxycyclododecadiene from 1,5,9-cyclododecatriene and H<sub>2</sub>O<sub>2</sub>. Still further, **Schulz US'956** only teaches a process for preparing epoxides using bis(triorganosilyl)peroxides.

Thus, both **Kuroda JP'579** and **Schulz US'956** only teach a process for producing a certain epoxy compound. Neither **Kuroda JP'579** nor **Schulz US'956** teaches or suggests the process for producing a β-hydroxyhydroperoxide compound or a carbonyl compound, or pH range for such process.

Moreover, it is submitted that **Hancock US'032** does not teach or suggest the reaction of olefin compounds directly to β-hydroxyhydroperoxide compounds or carbonyl compounds. The process of **Hancock US'032** comprises the steps of epoxidation and acidification, as shown in the reaction scheme at Col. 6 of **Hancock US'032** (*reproduced below*).



In the process of **Hancock US'032**, the products are formed by isomerization of epoxides, so that the products have the same number of carbon atoms as the olefins have.

The breaking the carbon-carbon bond of the olefin is not inherent in the process of the prior art, although the USPTO has made a different argument in the "Response to Argument" section of the outstanding office action.

Thus, the process of **Hancock US'032** differs in the step and the product from the claimed process. Even if the process of **Kuroda JP'579** or **Schulz US'956** is combined with isomerization of **Hancock US'032**, the carbonyl compound is not produced by oxidatively breaking a carbon-carbon bond of the olefin. Accordingly, it is submitted that a person of ordinary skill in the art cannot attain the claimed process based on the teachings of the above cited documents being applied by the USPTO against claim 8.

Consequently, the claimed process recited in instant claim 8 is not obvious from the teachings of the cited documents being applied against the same in the outstanding office action.

***Claims 9 and 10***

Instantly pending claims 9-10 respectively recite as follows:

*9. A process for producing a carbonyl compound, which comprises reacting a primary alcohol with hydrogen peroxide in the presence of a metal catalyst obtained by contacting*

*(A) at least one metal or metal compound selected from*

*i) tungsten compounds composed of tungsten and an element of group IIIB, IVb, Vb, or VIb,*

*ii) molybdenum compounds composed of molybdenum and an element of group IIIB, IVb, Vb, or VIb, and*

*iii) tungsten metal and molybdenum metal;*

*(B) at least one compound selected from tertiary amine oxide compounds and nitrogen-containing aromatic N-oxide compounds;*

*(C) hydrogen peroxide; and*

*(D) a phosphate compound,*

*wherein the carbonyl compound is an aldehyde and the amount of hydrogen peroxide to be used is 0.9 to 1.5 moles per 1 mole of the primary alcohol.*

*10. A process for producing a carbonyl compound, which comprises reacting a primary alcohol with hydrogen peroxide in the presence of a metal catalyst obtained by contacting (A) at least one metal or metal compound selected from*

*i) tungsten compounds composed of tungsten and an element of group IIIB, IVb, Vb, or VIb,*

*ii) molybdenum compounds composed of molybdenum and an element of group IIIB, IVb, Vb, or VIb, and*

*iii) tungsten metal and molybdenum metal;*

*(B) at least one compound selected from tertiary amine oxide compounds and nitrogen-containing aromatic N-oxide compounds;*

*(C) hydrogen peroxide; and*

*(D) a phosphate compound,*

*wherein the carbonyl compound is a carboxylic acid and the amount of hydrogen peroxide to be used is 1.5 moles or more per 1 mole of the primary alcohol.*

As seen above, present claim 9 defines a process for producing a carbonyl compound, which comprises reacting a primary alcohol with hydrogen peroxide in the presence of a metal catalyst obtained by contacting (A) to (D) as defined, wherein the carbonyl compound is an aldehyde and the amount of hydrogen peroxide to be used is 0.9 to 1.5 moles per 1 mole of the primary alcohol.

As also seen above, present claim 10 defines a process for producing a carbonyl compound, which comprises reacting a primary alcohol with hydrogen peroxide in the presence of a metal catalyst obtained by contacting (A) to (D) as defined, wherein the carbonyl compound is a carboxylic acid and the amount of hydrogen peroxide to be used is 1.5 moles or more per 1 mole of the primary alcohol.

The USPTO contends that claims 9 and 10 are unpatentable over **Kuroda JP'579**, in view of **Schulz US'956**, **Venturello US'276**, **Venturello EP'742** and **Ishii US'922**, and points out in the "Response to Argument" section of the outstanding office action that **Venturello** teaches the process claimed in the present claim 9.

However, **Venturello US'276** only teaches the epoxidation catalyst for olefin compounds, not a catalyst for a primary alcohol. Likewise, it is submitted that **Venturello EP'742** only teaches a process for producing a ketone from a secondary alcohol, not a process using a primary alcohol. Neither of the **Venturello's** documents teach or suggest a process for producing an aldehyde or a carboxylic acid from a primary alcohol.

Moreover, **Kuroda JP'579** and **Schulz US'956** only teach a process for producing an epoxy compound from an olefin compound. Neither **Kuroda JP'579** nor **Schulz US'956** teaches or suggests a process for producing an aldehyde or a carboxylic acid. Furthermore, **Ishii US'922** only teaches a process for producing a hydrogen peroxide, which process includes the steps of

reacting a primary or secondary alcohol and oxygen. The process of **Ishii US'922** does not use hydrogen peroxide. Thus, neither of the cited documents teaches or suggests a process for producing an aldehyde or a carboxylic acid from a primary alcohol.

The USPTO further contends in page 4 of the detailed office action that it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the catalyst of **Kuroda JP'579** with the alcohol of **Venturello**.

However, the process of **Kuroda JP'579** quite differs from that of **Venturello** in the reactant and the product. The catalyst of **Kuroda JP'579** is used for the reaction of 1,5,9-cyclododecatriene to give epoxycyclododecadiene, as discussed above. As such, it is submitted that a person having ordinary skill in the art would in no way be motivated to use the catalyst of **Kuroda JP'579** for the process of **Venturello** (which process comprises a reaction of a secondary alcohol to give a ketone).

Consequently, it is submitted that the claimed processes recited in pending claims 9-10 are not obvious from the teachings of all the cited documents being applied against the same claims in the outstanding office action.

Apart from the above consideration, applicants also submit that the applied cited art, whether considered singularly or in combination completely fails to provide those of ordinary skill in the art with any reason or rationale that would allow them to arrive at the instant invention as recited in any of pending claims 8-10. Any contentions of the USPTO to the contrary must be reconsidered at once.



***Conclusion***

Based upon the amendments and remarks presented herein, the Examiner is respectfully requested to issue a Notice of Allowance clearly indicating that each of the pending claims 8-10 is allowable under the provisions of Title 35 of the United States Code.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact John W. Bailey, Reg. No. 32,881 at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Director is hereby authorized in this, concurrent, and future replies to charge any fees required during the pendency of the above-identified application or credit any overpayment to Deposit Account No. 02-2448.

Dated: June 24, 2010

Respectfully submitted,

By 

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